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AUTHOR Fisher, Marvin
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ABSTRACT

In an effort to determine what doctoral graduates of Arizona's three universities thought about the strengths, weaknesses, and overall quality of their specialized graduate programs, a 35-item questionnaire was prepared and sent to 1976 and 1986 doctoral graduates. Information on this study is presented as one of the working papers in the final report of the Arizona Board of Regents' Task Force on Excellence, Efficiency and Competitiveness. Most questions were keyed to the respondent's experience with the graduate program. A few questions concerned the student's ability to compete professionally after graduation. One question asked for pre-program perceptions. The most important conclusions to be drawn from the survey are the extremely strong approval of the quality and relevance of graduate programs at the Arizona universities. Arizona graduates rated their supervising professors very highly. Graduate college staff were generally perceived as helpful. The following topics are among several discussed: institutional efforts, actions, and procedures; recruitment efforts; graduate college matching research assistant program; tuition and fee scholarships; employment of advanced degree recipients; program assessment and quality control; and incentives related to quality. Some of the nine conclusions and recommendations are: periodic surveys of advanced degree recipients can convey important information to the graduate colleges; graduate college staff were generally perceived as helpful in all three institutions; each institution has taken steps to increase minority participation in graduate programs; and efforts to recruit superior graduate students should not slacken. Contains 2 references. (SM)

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HE 022 479

THE QUALITY OF GRADUATE EDUCATION AT ARIZONA'S UNIVERSITIES

MARVIN FISHER

In an effort to determine what doctoral graduates of the three Arizona universities thought about the strengths, weaknesses, and overall quality of their specialized graduate programs, we prepared a 35 item questionnaire to be sent to 1976 and 1986 doctoral graduates. The alumni associations provided mailing lists for more than 1200 students. Because foreign addresses would produce problems of return postage and delayed delivery, they were removed from the list. Of the 1109 sent out, a total of 125 were returned as undeliverable. The total number of graduates sampled thus came to 984. The 441 analyzed responses constituted a return rate of 44.8%, a highly respectable figure, especially since no follow-up reminders were sent. Of the 441 responses utilized 210 were ASU graduates, 197 UA graduates, and 38 NAU graduates. (A copy of the questionnaire is appended to this report.)

The ASU graduates included those who were awarded Ph.D. degrees in a variety of fields, as well as those awarded Ed.D., D.B.A., D.M.A., and D.P.A. degrees. The UA graduates included a preponderance of Ph.D. degrees and a few Ed.D.'s. The NAU graduates were mainly recipients of the Ed.D. degree and only 7 Ph.D. recipients. The ASU and UA respondents included approximately twice as many males as females. The NAU respondents were almost evenly divided by gender.

No attempt was made to survey students who failed to complete the programs to which they were admitted. The alumni associations would have no such lists, but each graduate college could produce a list of those who, in recent years, dropped out without completing their advanced degree programs. If such a group were surveyed, their attitudes might well be less commendatory toward their institutions; on the other hand, the real reasons for dropping out might well have more to do with their own circumstances than with attributes of their institutions. We recommend that the universities undertake such a study.

Most of the questions are keyed to the respondent's experience with his or her graduate program and require recollection of details that could be difficult for some of the 1976 group. Some of the questions call for evaluation of program quality, of program requirements, and of faculty personnel. A few concern the students' ability to compete professionally after graduation. Only one question asks for a pre-program perception: #6 which asks for the major factors underlying the choice

Dr. Marvin Fisher, a specialist in American literature and cultural history, has been a member of ASU's English Department for 30 years, including six as department head. He has taught at three other American universities and three foreign ones. Among his several books is one on the beginnings of American industrialization and its impact on the economy, society, and the imagination.

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of graduate institution.

In this instance, the responses clearly indicate that UA graduates more often chose the institution because of the reputation of a particular program or of a particular faculty member. These factors also appear in the responses of ASU and NAU alumni but not with the same frequency.

SURVEY RESULTS

The most important question in the survey is #7: "Overall, how satisfied are you with your doctoral program?" Respondents could indicate a) very satisfied, b) generally satisfied, c) somewhat dissatisfied, and d) very dissatisfied. The results for the combined 1976 and 1986 groups from all three universities are 43.6% "very satisfied," 44.5% "generally satisfied", 9.6% "somewhat dissatisfied", 2.2% "very dissatisfied". The segment recording general to high satisfaction is a remarkable 88% -- an enviable rate of consumer approval. For the 1976 group, all universities, the results are 46.7% "very satisfied", 39.6% "generally satisfied", 8.6% "somewhat dissatisfied", 5% "very dissatisfied" -- a satisfaction rate of 86.3%. For the 1986 group, all universities, the results are 41.1% "very satisfied", 46.8% "generally satisfied", again a satisfaction rate of almost 88%. With only three 1976 doctoral graduates responding from NAU, percentages are less meaningful; but 2 of the 3 were "very satisfied." For UA 1976 graduates, the results were 46.3% "very satisfied" and 43.3% "generally satisfied" -- a satisfaction rate approaching 90%. For ASU 1976 graduates, the results were 46.4% "very satisfied" and 37.7% "generally satisfied" -- a satisfaction rate of 84%. For 1986 NAU graduates, the results were 62.9% "very satisfied" and 34.3% "generally satisfied" -- a 97.2% satisfaction rate. For UA the results of the 1986 sample were 34.1% "very satisfied" and 50.4% "generally satisfied" -- an 84.5% satisfaction rate. For ASU the results of the 1986 sample were 41.8% "very satisfied" and 46.8% "generally satisfied" -- a satisfaction rate of 88.6%. The opinion of those who dropped out could affect these approval ratings significantly; but lacking that information, we would have to conclude that the Arizona universities enjoy broad and deep support from doctoral graduates of recent years.

Question 8 asked for specific changes that would strengthen the respondents' doctoral program. Many 1976 graduates mentioned changes that they knew had since been instituted, some called for changes which they hoped had been instituted (such as more emphasis on computer applications in a given field), others felt that the elapsed time obviated useful suggestions. The 1986 graduates offered many more recommendations, often with a relevancy to specific programs that makes them difficult to cite or summarize in this report. They frequently called for more conscious attempts to recruit and retain faculty who displayed care and consideration for their students and who possessed and commmunicated familiarity with current research. Some respondents cited the need to trim "deadwood" in the faculty ranks, but more cited instances of helpful and knowledgeable faculty members. The results of questions 8 and 10 (which asked for changes in course requirements) would be of greater use to the individual graduate colleges, who could look for patterns of response in particular programs. For the future, it would seem worthwhile for graduate colleges to use a survey similar to this one to poll doctoral graduates

about two or three years after completion of their degree programs. It could provide information to reinforce quality control measures already in use in some of the universities.

Questions 11-15 focused on the preliminary or comprehensive examinations which precede the candidacy or dissertation stage of the doctoral program. These questions concerned the number of examinations (#11), the scope (#12), the difficulty or ease (#13), and their relevance to the degree program (#14). In each case only one possible answer indicated approval that requirements were "about right" and the percentage of approving responses for each question was #11 -- 87.5%, #12 -- 87.4%, #13 -- 90.7%, and #14 -- 84%. These results indicate extremely strong belief that the required examinations were appropriate, effective and relevant. A related question about the personal value of the dissertation asked "As an educational experience, was your dissertation a) very beneficial, b) beneficial, c) not very beneficial, d) definitely not beneficial?" The responses again reflect student approval of their graduate experience: a) 51%, b) 41.6%, c) 6.2%, and d) 1.1% -- with 92.7% viewing their dissertations as a beneficial educational experience.

Several questions related to the helpfulness (#19), the availability (#20), and the competence (#21) of the supervising professor. In each case the available responses were a) extremely, b) somewhat, and c) not very. The results were #19, a) 63.6%, b) 27.8%, c) 8.6%, #20, a) 66.5%, b) 25.8%, c) 7.7%; #21, a) 74.9%, b) 19.7%, c) 5.4%. Variations for each institutional group were slight, and the overall conclusion is that a significant majority of dissertation directors are perceived by their former students as having been extremely helpful, readily available, and extremely competent.

Questions 22 and 23 dealt with the participation of committee members other than the supervising professor. The range of responses was a) very extensive, b) somewhat, and c) not very. The results were a) 17.2%, b) 47.1%, c) 35.7%. This question exposes a weakness or inefficiency in graduate college procedures. In the vast majority of instances the students did not find their committee members other than the supervising professor extensively involved in the process. The graduate colleges at UA and ASU have recognized this and permitted doctoral committees to be reduced with departmental consent from five to three faculty members, plus a faculty member representing the Graduate College. Such a reduction in number should intensify or concentrate committee familiarity with the field and interest in the dissertation.

When asked to rate the helpfulness of Graduate College staff 37.4% considered them "very helpful," 37.6% "moderately helpful," 13.3% "not helpful," and 11.6% "had no contact." For the 1986 group alone, the ASU graduates rated Graduate College staff considerably higher: "very helpful", 52.8%; "moderately helpful," 40.3%, "not helpful," 4.2%, and "no contact," 2.8%. The UA 1986 graduates rated the Graduate College staff "very helpful," 32.1%; "moderately helpful, 35.8%; "not helpful," 21.7%; and "no contact," 10.4%. For NAU the results were "very helpful," 68.8%; "moderately helpful," 25%; and "not helpful," 6.3%.

Combining the "very helpful" and the "moderately helpful" categories, we find

ASU totaling 93.1%, UA 67.9%, and NAU 93.8%.

Several questions dealt with the financial strain of pursuing a graduate degree. Since the survey reached only those who completed doctoral degrees, the result might have been significantly changed if those who did not finish had also been included. Overall the doctoral graduates from 1976 and 1986 reported that 20.3% had great financial hardship, 50.5% had some hardship, and 29.2% not much hardship. Approximately three-quarters of the group held assistantships or fellowships, so some of these recipients must have experienced financial hardship also. More specifically, 8.7% did not have to work outside their graduate studies, 18.5% needed to work up to one-quarter time earning support funds, 27.4% worked one-quarter to one-half time, 27.4% also reported having to work one-half to three-quarters time, and 18% had to work three-quarters to full time while pursuing their graduate studies.

Asked whether their doctoral programs prepared them to compete in their chosen fields, 44.6% reported being "very well prepared," 46.1% "fairly well prepared," 8.2% "not well prepared," and 1.1% very poorly prepared." Combining the first two categories, we find that 90.7% of these graduates felt themselves well prepared for their ensuing professional responsibilities. Overall 81.3% are currently employed in the field of their doctoral work; for the 1986 group alone, the figure is 85.7%; and for the individual institutions, the 1986 figures are UA 83.3%, ASU 89.9%, and NAU 77%.

One question (#33) inquired about current annual income and all but a few responded. The breakdown for the 1976 and 1986 groups follows; the second column for each group indicates the number of respondents in each income category:

ASU

	1976		1986	
under $20,000	1.6%	1	5.6%	8
$20,000-30,000	1.6%	1	24.6%	35
$30,000-40,000	23%	14	28.2%	40
$40,000-50,000	28%	18	25.4%	36
$50,000-60,000	28%	18	14.1%	20
over $60,000	14.8%	9	2.1%	3

UA

	1976		1986	
under $20,000	7.4%	5	9.8%	12
$20,000-30,000	4.4%	3	34.7%	43
$30,000-40,000	23.5%	16	27.4%	34
$40,000-50,000	19.1%	13	17.7%	22
$50,000-60,000	12.2%	11	8.1%	10
over $60,000	29.4%	20	2.4%	3

NAU

	1976		1986	
under $20,000	33.3%	1	2.9%	1
$20,000-30,000			28.6%	10
$30,000-40,000			25.7%	9
$40,000-50,000	66.7%	3	17.1%	6
$50,000-60,000			17.1%	6
over $60,000		3	8.6%	3

The most important conclusions to be drawn from this survey are the extremely strong approval of the quality and relevance of graduate programs at the Arizona universities. This approval covers the totality of the graduate experience as well as specific aspects such as number, design, and effectiveness of required examinations and the professionally beneficial quality of the dissertation experience.

The supervising professor is a key element in this educational experience, and Arizona graduates rated their mentors very high in qualities of helpfulness, availability and competence. They were less generous in viewing the participation and involvement of other committee members, and the results support the greater efficiency from smaller committees -- three rather than five members.

Graduate College staff were generally perceived as helpful in all three institutions, but a lower rate of approval

at UA would seem to justify some closer attention, particularly in light of low ratings indicated by our Task Force survey of administrative services and discussed elsewhere in our working papers. It should be noted that in July of 1987 the Graduate College at the University of Arizona was reorganized, in part to address these types of problems.

Even though more than two-thirds of these doctoral graduates reported financial hardship in their years of graduate study, even though three-quarters of the group held graduate assistantships or fellowships. Neither the 1976 group nor the 1986 graduates could live off their stipends without drawing upon other resources or incurring debts.

Overall, they view their graduate programs as strong preparation for their professional careers -- preparation that enabled them to compete effectively with graduates of other universities.

INSTITUTIONAL EFFORTS, ACTIONS, AND PROCEDURES

Each of the three universities has a Graduate College responsible for monitoring the policies and procedures governing admission, progress toward a degree, and graduation requirements. In practice, each tries to recruit and admit the best students possible, to increase minority enrollment, to maintain program quality, and to graduate well prepared and fully competitive scientists, scholars, and professionals. Each has tried to maintain equality of opportunity and to attain quality of result.

Nowhere in our universities are the possible contradictions between the goals of maintaining equality and attaining quality more apparent than in our graduate schools. Some of the traditionally elitist schools, Stanford or Yale, for example, appear to be among the most successful in recruiting minority candidates for undergraduate and graduate degrees and providing them with the opportunities, the financial aid, and the academic support services that enable them to overcome a legacy of historical and social inequities. These elite universities have more funds for recruitment efforts and sustaining services than most state universities have, but state universities in areas of growing minority populations have become acutely aware of society's need and their responsibility to draw minority students into higher education, the sciences, and the professions. Ideally, every minority graduate with an advanced degree will have a multiplier effect on the youth of his or her ethnic group, attracting and encouraging scores of potential students who need living evidence of their career possibilities. To put it most succinctly, we will not see our Hispanic, Black, and American Indian citizens in our classrooms, laboratories, administrative offices, and board rooms in sufficient numbers until we see them in our graduate schools first.

The excellence of graduate programs, no less than undergraduate ones, lies not only in what we can do for the most gifted students we can attract but in what we can do for those whose promise is often in proportion to the obstacles they have had to overcome and the insecurities they still feel as they begin their graduate studies. The welfare of society, the stability of our communities and the prosperity of the nation will depend on our ability to develop the best in those superior students we attract and to provide the best possible educational experience for

the rest we attract, regardless of ethnicity. Harmonizing the goal of equality of opportunity and the goal of cultivation of quality has long been the concern of American higher education; it is even more essential as we try to plan intelligently for the future.

In order to provide equality of opportunity, each institution has several admission categories. Regular admission is granted to applicants who meet the grade average criteria and the course requisites for a specific program and who can present strong recommendations, if program requisites so specify. Both UA and ASU indicate the necessity of presenting the appropriate, nationally normed aptitude or advanced knowledge test scores and at least a 3.0 g.p.a. for the last two years (60 hrs.) of undergraduate course work. NAU does not specify either as standard criteria, but individual degree programs may do so. At present only the ASU Graduate Catalog has an index listing for "Minority Recruitment and Support," an oversight that should be remedied quickly by UA and NAU.

UA and ASU both list a category of admission with deficiencies, stipulating that the identified deficiencies must be completed without being counted toward the graduate degree. NAU uses provisional standing for students with deficiencies, but permits a maximum of 12 graduate credits earned during provisional status to count toward the degree. ASU and UA use provisional admission for "a student who does not meet minimum academic standards but has counterbalancing evidence to suggest potential for success." After completing 12 graduate credits and meeting the specified provisions, the student will gain regular admission or be withdrawn from the program. All three universities have a category of non-degree status, permitting students with undergraduate degrees to take graduate courses without completing the normal admission procedure or without having met the normal requirements. Both UA and NAU permit a maximum of 6 graduate credits earned by a non-degree student to be counted toward a degree if the student subsequently gains regular admission; ASU permits 9 graduate credits to count toward a degree.

Thus all three universities seek to maximize equality of opportunity through a process of flexible classification that provides access to graduate study to applicants who vary in the extent and quality of their undergraduate preparation. Three categories seem to have sufficed at NAU; ASU and UA operate with four categories and may gain additional flexibility through its distinguishing "provisions" from "deficiencies."

RECRUITMENT EFFORTS

None of the universities has kept or could easily obtain data regarding the percentage of minority applicants accepted for graduate study and the percentage denied, though all now recognize the need to do so. The lack of information is not surprising, nor is it evidence of culpability on anyone's part. However, it does not speak well for the accountability measures which should be an integral part of any minority admission and retention program. The greater likelihood of discriminatory policies thirty or forty years ago led to a period of more consciously evenhanded treatment with no questions asked about race or ethnicity. Efforts to implement affirmative action policies in the 1970's produced fitful reactions almost as often as they produced fruitful consequences.

At this point in the 1980's quotas are out but goals are in. The effort to increase minority representation in graduate programs is not only morally informed but also socially responsible and intellectually grounded. It is more pragmatic in its operation than ideological in its motivation. Arizonans and their political leaders have not been conspicuous for their social and political foresight; but the evidence of demographic trends and their consequences has begun to penetrate some of the harder shelled realists.

The University of Arizona has invested considerable resources in its efforts to make graduate study available to minority students, but the Vice Dean feels the need for better coordination to make those efforts more productive and has described the recruitment program as a series of present efforts and future plans.

PRESENT

1. Eight $10,000 fellowships allocated to departments to recruit minority students. Graduate Tuition Scholarships available for these students, if needed. Areas chosen are those where minority students are underrepresented and where effective recruitment plans exist.

2. These monies, when coupled with other sources of funds, allow us to fund 15-20 minority graduat students per year. In addition 15-20 Graduate Academic and Graduate Tuition Scholarships are allocated each year for minority students. Increasing Graduate College $10,000 Fellowships for minority students to 20 for 1989-90.

3. Five areas with minority underrepresentation (Geosciences, Linguistics, Anthropology, Optical Sciences, and Electrical Engineering) chosen for participation in the Patricia Roberts Harris federal grant program.

4. 50 of the Associate Dean's time is spent on affirmative action activities. She is in contact with the Office of Minority Student Affairs and its three assistant deans, the Affirmative Action office and individual minority students who seek assistance from the Graduate College. An associate dean for minority students will be hired in the near future.

5. The opening, administration and planning of the American Indian Graduate Center is a milestone at the University of Arizona. The center, which is coordinated by the Intertribal Council, an Advisory Board and the Associate Dean will be sued mainly as a palce for Indian students to meet and hold events of interest to Native Americans. The peer mentoring and having a place to meet will undoubtedly result in eliminating the feeling of isolation reported to us by Indian students and help to retain this population so important to the state of Arizona.

6. Colloboration with Pima Community College by a "Visiting Scholar Program". The Graduate College has contacted the President of Pima Community College and has agreed to send two minority doctoral candidates to teach two courses a semester at Pima Community College. The purpose of this project is to have minority students at Pima see their peers in professional positions and serve as an incentive to pursue graduate studies. Planned for the Fall is one class in Humanities and

another, not yet determined.

7. Both the Vice Dean and Associate Dean schedule time once a month for counseling and mentoring minority graduate students. The Deans use these meetings to identify procedures and initiate action to resolve them and to develop new policies and procedures.

8. Participation in three consortia that provide names of prospective minority graduate students and their areas of interest:

   1) Project 1000, targeted at Hispanic students;

   2) Western Name Exchange, listing many varied groups and areas of interest; and

   3) Graduate Opportunities for American Indians. Names of prospective students are sent to appropriate academic units, which then write to the students.

9. Preparation of a brochure on graduate education at UA aimed at minority students.

10. Preparation of a slide presentation for faculty to use on visits elsewhere.

11. Scheduled visits by Graduate College academic staff to minority institutions.

12. Identification and utilization of minority alumni for recruiting.

13. Providing recruitment plans and necessary funds to departments for implementation.

In an ABOR report on "Minority Recruitment and Retention," dated December 4, 1987, comparative data are provided for each university. At UA Graduate College enrollment was as follows:

Fall 1986	MALE					FEMALE				
	Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
	65	17	74	25	1654	96	23	38	32	1560
	3.5%	.93%	4.0%	1.4%	90.1%	5.5%	1.3%	2.2%	1.8%	89.2%
Fall 1987										
	77	26	81	17	1507	81	24	44	33	1405
	4.5%	1.5%	4.7%	1.0%	88.2%	5.1%	1.5%	2.8%	2.1%	88.5%

The strongest claim that one could make for these figures is that minority enrollment in most categories is edging upward.

Scholarship aid for 1986-87 (including Summer '87) was allocated as follows:

MALE					FEMALE				
Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
15	6	14	12	223	32	2	9	14	176
5.5%	2.9%	5.1%	4.4%	82.0%	13.7%	.86%	3.9%	6.0%	75.5%

Other forms of financial aid (loans, grants, employment) supplemented scholarships, but the division of scholarships is indicative.

Advanced degrees in the graduate/professional category for 1985-86 and 1986-87 (men and women) were awarded as follows:

	Hispanic	Black	Asian	Indian	Other
1985-86	59	21	28	9	1626
	3.4%	1.2%	1.6%	.5%	93.3
1986-87	43	9	30	6	1630
	2.5%	.5%	1.75%	.25%	95.0%

During this limited period from 1985-86 to 1986-87, the number of graduate/professional degrees awarded to minority students edged downward in most categories at UA.

ASU seems a bit farther along, according to a summary of Graduate

College initiatives for minority students, 1986-88. The major initiative combines a special admissions category with an academic support program focused on minority applicants. An assistant dean of the Graduate College describes it thusly:

One of the earliest and most important Graduate College programs was its "Academic Support Program," which is closely tied to special admissions. This program was designed not to be a "quick-fix" for minority underrepresentation among faculty and students, but to have the long-range effect of increasing the number of minority graduates who, in turn, increase the pool for potential faculty recruitment. Early in the conception of this program, it was realized that we would need to admit a larger number of minority students than in the past to meet this goal. To do so, we would have to admit from a pool of students not showing the same numerical academic profile (grade point average, standardized test scores, etc.) as the majority population. Clearly we would need to take account of a variety of indicators to predict minority students' success in graduate school. Equally clearly, disproportionate numbers of minority applicants would be older students, would have academic deficiencies, and would have a high level of financial need. Accordingly, we recognized that many minority students are caught in a "Catch 22" situation of being "marginal admits," whereby they (a) would not be eligible for regular departmental competitive, merit-based funding, (b) would have a greater financial need (thus would be accumulating a larger debt burden) than majority students, and (c) therefore, would have to work. These very circumstances pose a great risk for failure during the first year (or perhaps two) of graduate school.

The Graduate College Academic Support Program was created two years ago to meet these needs. Because most departments are properly reluctant to admit marginal students, and because the Graduate College was unwilling to admit students without a fair chance of academic success, we included certain features in this program to help departments get students successfully established during their first year. For a student to be eligible for the program, a department must offer the student regular admission, thus encouraging the department to claim ownership of, and assume responsibility for, the student, even though the student under other circumstances would be admitted provisionally if at all. Only with the regular admissions can the beneficial features of this program go into effect. The program works as follows.

The first element of the program is financial assistance. From Set Aside Funds and tuition and fee is that these marginal students, who were at academic risk under the best of conditions, would be virtually assured of academic failure if forced to work excessively to support their education. For the first two years of the program, we simply used grant funds to meet each student's needs as determined by the College Board's Financial Aid Assessment and the ASU Financial Assistance Office. Using these criteria, we were able to fund approximately 20-25 students for 1986-87 and for 1987-88.

In 1988-89, because of increased recruitment efforts (which will be addressed later) our pool of potential special admissions has expanded to nearly 100 students. To meet this larger need, we have included an additional feature in the program. With the cooperation of the ASU Financial

Assistance Office, we have identified funds to provide 30 need-based GA's at $2,500. Students receiving these awards will be hired into their own departments and will not be permitted to work more than ten hours per week. The awards are a combination of federal work-study funds ($54,000), Graduate College contribution ($13,500) and department match ($13,500). In effect a department can hire a .25 FTE GA for $378. These awards create an early, personal relationship between faculty members and students--an import key to student success in graduate school--and provide the added benefit of involving students in departmental life early in their graduate careers.

The second element of the program is individual mentoring. The Graduate College provides each minority student with a departmental peer who works with him/her for three hours per week, acclimating the new student to graduate school and to the culture of the department. The mentor does not necessarily act as a tutor (we have other means of teaching content). Rather, the mentor is an established peer who helps the "mentee" become a part of the informal information flow of the department, which is crucial to the survival of a graduate student, and more generally helps socialize the student to graduate school.

The third element of the program is faculty advisement. A faculty adviser must be assigned to the student to insure that someone in the department has responsibility for the student.

ASU is in a good position not to repeat the errors of other institutions that initiated minority programming at an earlier date. The benefits and merits of the Academic Support Program, and what should assure its success for students, are the components that get the student involved early on in the life of the department and into contact with a faculty member and a student mentor. Although the large fellowship programs which were developed at some universities did provide necessary funding for graduate study, fellowship programs often had unwittingly built in a failure factor: although the students were handsomely funded, they were isolated within their academic units, resulting in a high rate of attrition and academic failure. Academic support does not negate the need for financial aid, or course. In fact, the ASU program is designed to help marginal students meet the costs of graduate education without working excessively, while bringing them fully into their departments.

This innovative program is reinforced by several initiatives keyed to the group of minority applicants admissible under the standard criteria but not fully competitive for departmental teaching and research assistantships:

GRADUATE COLLEGE MATCHING RESEARCH ASSISTANT PROGRAM

One new source of funds from the President's Office will be used to target a well-prepared minority student population through awarding research assistantships. Funds will be used to augment existing deparmtental funds on a competitive basis. Departments who award a quarter-time or larger assistantship to a minority student can apply to the Graduate College for an additional assistantship of the same fractional FTE for a second minority student. A minimum of six such matching research assistantships will be awarded. These awards are not

necessarily for recruitment, but may be used to enhance the participation and support of minority students in their departments.

RESEARCH ASSISTANTSHIPS FROM VICE PRESIDENT FOR RESEARCH

Another source of funding for the better prepared students is a block of research assistantships from the Office of the Vice President for Research. Six awards are available, each one-half time FTE for an academic year at a total value equal to the department's established rate.

AMERICAN CONTINENTAL SCHOLARSHIPS

For Project 1000, headquartered at ASU and targeted specifically towards Hispanic students, $5,000 has been awarded by American Continental. For this new program, awards will be coupled with waivers of tuition and fees.

PATRICIA ROBERTS HARRIS FELLOWS

From the federal government, ASU will have six Patricia Roberts Harris fellowships, two continuing and four new awards in Psychology, Chemical and Biological Engineering, and Public Affairs.

TUITION AND FEE SCHOLARSHIPS

For 1988-89, blocks of Regents Graduate Academic Scholarships RGAS for (in-state fees) and Regents Graduate Tuition Scholarships RGTS for (out-of-state tuition) were reserved for recruiting and retention awards upon application by departments. These blocks of awards were held back as supplements to the RGAS and RGTS awards allocated all departments. The RGAS (in-state) block was also designed to support departments in topping off graduate assistant offers, which carry only remission of out-of-state tuition.

Realizing that these special initiatives in behalf of minority student enrollment in graduate programs depend upon attracting a large number of applicants, ASU has generated mass mailings to students in the Educational Testing Service ETC Locator Service and the Western Name Exchange. Follow up telephone calls and correspondence have substantially increased the number of students applying. For 1988-89, ASU devised a tracking system to monitor the admissions process of every minority student to insure appropriate treatment in the deparments and to use limited resources to best advantage in competing for good students. The Graduate College's Admissions Office will flag all minority applications; to assure expeditious evaluation, a form letter will be attached to minority students' files when they are forwarded to the departments. This procedure will facilitate maintaining detailed records of the kinds of students applying and will help departments with admissions decisions. As a part of assisting departments and attracting admitted students to ASU, the Graduate College provides travel money to fly admitted minority students to the ASU campus for recruiting visits (continuing a program begun in 1987-88).

Not only has ASU expanded efforts for reaching a national and regional pool of students, it has also focused on local undergraduate minority students as a potential pool for graduate school recruitment. This past spring semester, the Graduate College was host to ASU undergraduate students who were identified for participation in the Western

Name Exchange Program. These students were invited to a workshop in which they were given information on how to seek out and apply to graduate school and acquire financial aid. The workshop was followed by a banquet dinner. Attracting students to the program was a cooperative effort involving undergraduate units, who helped contact and personally invite students; many graduate academic, service, and administrative units were represented at the dinner. This university-wide effort to aggressively encourage ASU's minority students to consider graduate study will be repeated next year.

The limited data from the ABOR report cannot serve to evaluate the potential effectiveness of these ASU initiatives but should provide a base for subsequent evaluation:

Fall 1986	MALE					FEMALE				
Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
172	79	144	28	3820	248	71	101	36	4812
4.1%	1.7%	3.4%	.7%	90.2%	4.7%	1.3%	1.9%	.7%	91.3%
Fall 1987									
Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
168	74	158	31	3892	251	108	101	47	5141
3.9%	1.7%	3.7%	.7%	90.0%	4.5%	1.9%	1.8%	.8%	91.7%

Clearly no progress can be discerned from these figures.

Scholarships for 1986-87 were allocated as follows:

Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
32	23	23	14	779	64	28	16	19	811
3.7%	2.6%	2.6%	1.6%	89.4%	6.9%	2.9%	1.7%	2.0%	84.7%

Since UA allocations for scholarship aid to minority graduate students exceed ASU scholarship awards percentage-wise for 1986-87, there is room for ASU's special initiatives to take effect.

Advanced degrees in the graduate/professional category at ASU for 1985-86 and 1986-87 were awarded as follows:

1985-86	MALE					FEMALE				
Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
22	7	11	5	568	34	13	15	9	569
3.6%	1.1%	1.8%	.8%	92.7%	5.3%	2.0%	2.3	1.4%	88.9%
1986-87									
Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
25	4	20	4	582	38	14	13	4	717
3.9%	.6%	3.1%	.6%	91.7%	4.8%	1.8%	1.7%	.5%	91.2%

Although there are no clear indications of minority progress in earning graduate degrees at ASU from 1985 to 1987, there are marginally better graduation rates than at UA.

Graduate College efforts to increase minority student enrollment at NAU have gained focus since 1986. Currently they consist of the following:

1. Participation in the Educational Testing Service Minority Graduate Student Locater Service. Letters and brochures sent to prospective applicants by the Graduate College and by appropriate departments.

2. Participation in the Consortium for Graduate Opportunities for American Indians. This consortium of 15 universities is now headquartered at NAU and is committed to increasing American Indian representation in graduate programs, with the ultimate goal of their becoming faculty members.

3. Recruitment trips to California universities and state colleges in 1987. Plans to extend visits to New Mexico in Fall 1988.

4. Participation in the Patricia Roberts Harris Fellowship Program to attract minority students to the areas of Business, Forestry, Biology, and Educational Administration at NAU.

5. Monthly monitoring of departmental

efforts at minority recruitment.

6. Distribution of materials to minority student advisor throughout the U.S.

7. Reserving a percentage of graduate assistantships for minority students and liberal use of tuition scholarships for minority students.

8. Future participation in Project 1000 aimed at increasing Hispanic enrollment in graduate programs.

Minority enrollment data for NAU's Graduate College follows:

Fall 1986	MALE					FEMALE				
	Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
	47	4	8	32	969	68	17	9	131	1414
	4.4%	.38%	.75%	3.0%	91.4%	4.1%	1.0%	.55%	8.0%	86.3%
Fall 1987										
	Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
	64	8	5	39	955	87	15	6	89	1675
	6.0%	.75%	.47%	3.6%	89.2%	4.6%	.8%	.32%	4.8%	89.5%

Increases in some categories seem to be offset by drops in others, so the data serves to provide a base rather than suggest a trend.

Since NAU did not separate undergraduate scholarship aid from graduate aid, we move to the area of graduate degrees awarded for 1985-86 and 1986-87:

1985-86	MALE					FEMALE				
	Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
	5	1	0	6	114	9	2	2	8	231
	4.0%	.79%	0	4.8%	90.5%	3.6%	.79%	.79%	3.2%	91.7%
1986-87										
	Hispanic	Black	Asian	Indian	Other	Hispanic	Black	Asian	Indian	Other
	8	2	3	3	180	4	1	0	6	234
	4.1%	1.0%	1.5%	1.5%	91.9%	1.6%	.4%	0	2.4%	95.5%

None of the three universities has for the Fall 1985 and 1986 semesters awarded more than 10% of its graduate degrees to minority students. But in each case this period coincided with emphasis on and new initiatives in minority student recruitment. It should be instructive to see whether these efforts produce measurable gains, especially in the case of ASU's extensive effort to add further flexibility to minority admissions, remove barriers to financial aid, and create a network of support for minority students. For good reason, any productive efforts to recruit, retain, and graduate minority students should be shared and emulated by all three universities. The technology of effective recruitment is worthy of institutional transfer.

The recruitment of superior students has not been forgotten while the universities seek to implement their social agenda. The enrollment and graduation of superior candidates for advanced degrees has many advantages for any university and is even more essential for a research university. The quality of graduate students impacts the quality of undergraduate teaching, the quality of research, and, because so many graduates with advanced degrees remain in-state, the cultural and economic climate of the state.

Superior graduate students are more likely to be drawn to institutions with strong reputations in their field of disciplinary interest or to institutions where a particular individual is known to them or to one of their undergraduate teachers. A study of limited dimension based on data 5 years back demonstrated that strong departments at UA drew applicants with mean Graduate Record Examination scores significantly higher than the national means for those disciplines. Thus the ability to attract high quality students is discipline-dependent, and stronger departments were better able to compete effectively with the best departments nationwide.

Each of the graduate college deans complained about the inadequacy of scholarship funds available for recruiting superior students and the scarcity of research support or travel funds for students already enrolled. The exceptions are those graduate students hired under the auspices of externally funded research projects. These grants are often written with more generous provision for graduate student support than teaching or research assistantships could provide. Laboratory and office space are not ample, and computer access is sometimes very limited for graduate students. Both ASU and NAU graduate colleges set aside a sum for graduate student travel to present research results at conferences. UA students must depend on departmental funds, often quite limited, or the provisions of research grants, of which UA of course has more.

The majority of graduate students depend on teaching or research assistantships, with stipends ranging from about $5,000 to just over $8,000 for half-time appointments. A constructive step that would aid in the recruitment of superior students from out-of-state would be for the ABOR to waive resident tuition as well as non-resident fees, as the majority of state universities do. At present a non-resident graduate student who is awarded a merit-based teaching or research assistantship must pay $1,200 annually in registration fees, effectively lowering the average stipend from $6,700 to $5,500. In many cases, a teaching assistant must teach four courses annually for this sum. The lack of married student housing at ASU is also a district disadvantage for graduate students with limited resources.

If we think that the Arizona universities are currently in a growth stage qualitatively as well as quantitatively, there are some sobering indications in the list of National Science Foundation awards for graduate study in the natural and social sciences, mathematics, and engineering. Of the 685 fellowships awarded for 1988-89, four went to baccalaureate graduates of Arizona universities -- one from UA, two from NAU, and one from ASU (who will continue at ASU). Three graduates of other universities have chosen to pursue graduate degrees in Arizona under the same award program -- two at UA in earth science and in experimental psychology, one at ASU in organic chemistry. Thus UA and ASU will each have two NSF Fellows pursuing graduate degrees, and NAU will have sent two NSF Fellows out of state. Even with such skimpy data, it seems apparent that the two larger universities did not do too well, that their graduate programs drew twice as many NSF Fellows as their undergraduate programs produced, and that NAU has reason for pride in the quality of its undergraduate preparation.

EMPLOYMENT OF ADVANCED DEGREE RECIPIENTS

Large universities do not do an especially good job of tracking their advanced degree graduates. Alumni associations do so for fundraising purposes and periodically publish brief summaries of personal or professional accomplishments, very ephemeral in nature. Departments or particular individuals in departments often have an informal record of where their advanced-degree recipients have gone and what they have done. Annual efforts try to identify alumni whose achievements merit recognition, and decennial reviews usually include sections on the professional success of program graduates. New means of information

storage and retrieval should improve the process of keeping track.

The limited data provided by our survey of 1976 and 1986 doctoral graduates indicated that these groups held markedly favorable opinions about the quality of their academic preparation and their ability to compete professionally. The information provided by answers to the salary question reinforced the general impression of their professional competitiveness. The graduate colleges, however, have not systematically kept track of advanced degree recipients and generally depend on departments to supply such information when it is needed.

A higher proportion of master's degree receipients remain in Arizona than do doctoral recipients. Whether this has a bearing on competitiveness is not clear. Doctoral graduates generally face tougher competition in the positions they apply for, and the majority of those who go into university teaching apply for jobs out-of-state. In a survey of 1985-86 doctoral graduates at UA, a group numbering 261, just over one-third planned to remain in Arizona. They listed their employers as follows:

University of Arizona	16.8%
Other colleges and universities	32.2
Foreign academic institutions	2.1
Medical schools	1.4
Community colleges	2.1
Elementary or secondary schools	7.7
Foreign governments	2.8
Federal government	5.6
Industry	17.5
Self-employed	0.4
Other	3.5

Since it is not customary for Arizona universities to hire their own doctoral graduates on a permanent basis, it is likely that the high number listing UA as their employer held post-doctoral research appointments, ranging from several months to three years.

ASU provided a summary of employment for advanced degree recipients of six departments undergoing review. The group surveyed had received master's degrees or doctoral degrees between 1980 and 1986:

Department	Count	Number & Percentage Remaining in Arizona		Sampling of Arizona employers
Chemistry	76	31	40.8%	Unidynamics, Talley Defense, Honeywell, Motorola, ASU
Civil Engineering	69	47	68.1%	Garrett, US Army Corps of Engineers, Dept. of Transportation, Bechtel
History	56	41	73.2%	UA, AZ Dept. of Health, Tempe and Phoenix high schools, The Onyx Press
Physics	27	8	30%	NA
Spanish	26	18	69.2%	Area schools and ASU
Zoology	58	28	48.3%	AZ Dept. of Health, Maricopa Community College District, Phelps Dodge, area schools

The number remaining in-state and contributing their skills and intelligence to the local economy and community is extraordinary high -- more than 55% of advanced degree recipients.

NAU could offer a cumulative enumeration of alumni by profession and some anecdotal information from a few departments. Since so many advanced degree recipients were already established in educational careers, an even higher percentage may remain in Arizona.

Because such a high percentage of graduates with advanced degrees remain in Arizona, the state stands to benefit from the quality of their contribution. If the universities attract superior graduate students and if high quality faculty direct their work, the likelihood of more productive and

creative research is strengthened. If superior students are drawn to our graduate programs, the state will retain better quality professionals. In addition to these relatively short-term benefits, long-term benefits also exist: superior graduate students are more likely to address more important research problems that result in improved crop yields, new treatments or cures for diseases, new ways of studying the physical universe, or better approaches to social problems.

PROGRAM ASSESSMENT AND QUALITY CONTROL

Issues of quality control are addressed at several stages by different agencies of the Graduate College, the academic unit offering the degree program, or by the Graduate Council or Graduate Committee, an appointed and broadly representative faculty group with special responsibilities for graduate education. Both the Graduate College and the academic unit set standards and requirements for admission; the academic unit sets specific course requirements and evaluates the students' progress; the Graduate College sets requirements for theses and dissertations and appoints a representative to evaluate the dissertation and to observe and report on the quality and conduct of the oral defense; and the dissertation itself reflects the direction and suggestions of a faculty supervisor and a committee of from two to four additional faculty members. At each university members of the Graduate College staff monitor the departmental procedures, the student's progress toward completion of all requirements, and the format of the culminating project.

Each of the Graduate Colleges requires a periodical review of academic degree programs, on a ten-year cycle or more frequently if possible. At UA the process involves three levels of review: self review by the unit, university review, and outside review by highly qualified individuals in the appropriate discipline. This process provides the information necessary to obtain a true picture of the strengths and weaknesses of departments or programs. If the program is no longer relevant, if the faculty and resources are inadequate to support a program, or if student participation is too low, termination of the program may be recommended. However, some excellent programs may be of such limited interest that relatively small student populations are to be expected; thus size alone is not a sufficient reason for termination.

The process of review and assessment considers many indices of quality: national and international awards to faculty or to present and former students, external funding for research, election to significant scholarly and scientific academies, participation in national panels or review boards for research awards, and service on editorial boards or in the activities of major national and international professional associations. Presumably, any recommendation for termination of a degree program would consider these indicators of quality as well as student population and degree productivity.

The UA Graduate College is also an active participant in the program review process and follow-up measures. On completion of the review, a plan is developed to improve the program where weaknesses exist. The Graduate College helps determine the goals in this plan and monitors the progress toward

meeting these goals. In those cases where the review process results in a recommended termination, the Graduate Council and ultimately the Graduate College bear special responsibility.

A summary of graduate program changes at UA over the past decade suggests a good deal of self scrutiny. Most of the changes are name changes in keeping with professional currency. Other categories of change include programs discontinued, for example the M.S. in Addiction Studies and the M.Ed. in School Library Science; programs divided, for example Romance Languages into Departments of Spanish and Portuguese and of French and Italian; and programs combined, for example Physiology and Animal Physiology into a single department or the M.S. and Ph.D. in Molecular Biology deleted and combined with M.S. and Ph.D. in Cellular and Developmental Biology to form a department and major in Molecular and Cellular Biology. Of course some new programs were added: a Department of Classics, indicating that potentially high enrollment was not a crucial concern, and such interdisciplinary programs as Bioengineering, Biophysics, and Insect Science, indicating that current research opportunities were, quite properly, a concern.

At ASU, where the Graduate Council plays a prominent role in setting policy and conducting the review process, an effort is underway to accelerate the review cycle by instituting an interim review mid-way through the ten-year period. Thus, in an effort to improve program quality and to monitor progress, each program will be reviewed every five years. Furthermore, decennial reviews of graduate programs will be scheduled insofar as possible in advance of accreditation reviews by the North Central Association or by accrediting agencies linked to particular professional associations. Ideally the decennial review should identify any areas of weakness and permit corrective action to begin before a scheduled accreditation review.

The main objective of the decennial reviews has been to provide the ABOR and the ASU administration with comprehensive information about academic units and their degree programs. In a rational sequence of reviews the decennial review would help a unit prepare for accreditation reviews, the objectives of which are to determine whether programs meet national professional standards and deserve the measure of credibility that successful accreditation conveys. The interim reviews conducted by the Graduate Council have the main objective of monitoring the progress and improvement of units in areas identified by the decennial and accreditation reviews. Taken together, these program reviews can effectively inform institutional planning, help maintain and enhance program quality, direct resources to the best programs, and stimulate constructive action at the department and college level.

New programs dominate the summary of program changes over the past decade, suggesting the rapid growth of the institution in many regards. Other changes include the renaming of departments or programs; splitting departments into separate entities as their growing maturity justifies, for example Botany and Microbiology; and "disestablishing" programs and departments for more efficient utilization of resources. Among the programs deleted at ASU are master's degrees in

Child Drama, Community Education, and Agriculture. The College of Education has undergone numerous and major reorganizational changes as seven departments were transformed into three divisions, Ph.D. programs in Secondary Education and Social and Philosophical Foundations terminated, and four Education Specialist degrees deleted: Counselor Education, Elementary Education, Higher and Adult Education, and Secondary Education, New interdisciplinary programs are fewer than at UA, but still evident in such examples as the Ph.D. in Science and Engineering of Materials, which joins faculty and resources from the Colleges of Engineering and Liberal Arts and Sciences.

NAU is in the midst of its second university-wide review of all graduate programs since 1981. The review, which involves a stage of self study by the academic unit, a stage of further examination and critique by a faculty committee from other academic units, and a stage of evaluation by consultants from outside the institution. The objective of this review process is to identify programs of high quality and programs with problems that need concerted attention. The mechanism for launching this review is the appended questionnaire.

In many cases this internal review will be preparatory for a decennial review or an accreditation report; in some cases it may be subsequent to one of these formal reviews. In either case, it would offer a means of assessment that identifies strengths and weaknesses or a means of measuring progress toward stipulated goals and program improvement.

Program changes during the past decade are quite evenly balanced between deletions and additions. Deletions include M.A.'s in Business Education, Home Economics Education, Industrial Education, Teaching English, Teaching Social Science, Music Education, Art Education, and Criminal Justice. In addition five Education Specialist programs were deleted: Guidance and Counseling, Elementary Principalship, Secondary Principalship, Superintendency, and Supervision. Programs added, all at the Master's level, include Clinical Speech Pathology, Bilingual/Multicultural Education, Public Administration, Counseling Art, and Quaternary Studies. The pattern indicates a maturing graduate program keyed to student and state need and aware of faculty strengths and regional resources.

INCENTIVES RELATED TO QUALITY

In most cases special recognition of faculty efforts to do well at what they have chosen to do might seem superfluous. There is inherent pride in teaching well at the undergraduate and graduate levels; there is additional satisfaction in directing graduate students and launching them on their professional careers; and there is a special gratification in seeing them independently established and professionally recognized. Ultimately, they are important means for establishing the reputation of individual faculty members and of the institution itself. Special recognition for those who perform well in teaching and directing graduate students emphasizes an institutions values and strengthens the morale of its faculty.

For these reasons all three Arizona universities try to establish a reward

system that recognizes the quality of graduate teaching and the direction of theses and dissertations as contributions furthering the institutional mission. Promotion, tenure, and merit determinations at all three universities are based in part on the individuals's involvement in graduate instruction. All three universities have special awards which may recognize excellence in graduate as well as undergraduate teaching.

Even apart from these forms of institutional recognition, there are important incentives that draw faculty members to graduate teaching: the opportunity to teach more advanced subject matter to more advanced students in smaller classes with opportunities for greater interaction. Graduate education is in many areas more closely allied to research, and directing graduate students can accelerate the professor's own research. And, as implied earlier, the quality of one's involvement and the success achieved is a factor in peer recognition -- an important if less tangible incentive.

Apparently only ASU has gone a step farther in increasing peer recognition and institutional regard for outstanding teaching and direction of graduate students. The Graduate College and the ASU Foundation, in recognition of the institution's first 50 years of graduate education, have established an annual award for outstanding graduate mentors. For the first year, three faculty members in three distinct academic areas were honored, and their views of graduate education published in a form that illuminates the characteristics and differences in graduate education in the humanities, sciences, and teacher training. Even more tangible recognition is conveyed by ASU's Distinguished Research Awards, which free outstanding researchers from classroom duties for a year and enable them to concentrate on research and the direction of graduate students. These awards are patent incentives and worthy of broader transfer and adoption.

CONCLUSION AND RECOMMENDATIONS

- Periodic surveys of advanced degree recipients can convey important information to the Graduate Colleges. Surveys of those who do not complete degree programs might contribute contrasting information or suggest measures to increase retention and completion.

- A survey of doctoral graduates of all three universities indicated strong approval of the quality and relevance of graduate programs and of the procedures and requirements that support them.

- They deemed the quality of direction and supervision very high but committee involvement significantly lower, suggesting that Ph.D. committees might function more efficiently with three rather than five members.

- Graduate College staff were generally perceived as helpful in all three institutions, but a lower rate of approval at UA would seem to justify some closer attention and improvement.

- The financial hardships reported by advanced degree recipients warrant closer attention to maintaining the competitive level of stipends for teaching and research assistants and the desirability of waiving resident

MISSION DEVELOPMENT AND STRATEGIC PLANNING

tuition fees to raise the stipends.

- Each university has taken steps to increase minority representation in graduate programs. ASU has launched the most innovated and multi-faceted plan. Although it is too early to discern any results, the operation of the plan should be watched closely to see whether aspects of it might be adapted to the other universities.

- Efforts to recruit superior graduate students should not slacken. They are attracted to research-active departments which can offer sufficiently competitive scholarships and assistantships. In these areas none of the Arizona universities is sufficiently competitive.

- Graduate program review and assessment are essential to building and maintaining quality. For best advantage the cycle of decennial reviews, accreditation reviews, and interim reviews should be planned to facilitate program development, progress, and improvement. Reviews should also be effectively utilized in institutional planning.

- Although the reward system at all three universities recognizes the positive value of a faculty member's contributions to graduate education, only ASU has made a concerted attempt to reward its most productive researchers and its most outstanding graduate mentors. These awards dignify an important area of educational activity and merit consideration by the other institutions.

APPENDIX

The Status of Research Activity at Arizona's Universities,
Marvin Fisher, June 1988

University Research and Economic Development in Arizona Today,
Marvin Fisher, June 1988